

CLAIMS

1. A load controller provided in a hydrostatic  
5 transmission for a work vehicle, wherein  
power supplied from an engine is branched to  
drive an implement system and a traveling system, and a  
hydrostatic transmission is provided in the traveling  
system;

10 the hydrostatic transmission connecting, in an  
oil-hydraulic closed circuit, an oil-hydraulic pump  
driven by the engine and an oil-hydraulic motor driven by  
the oil-hydraulic pump;

the load controller comprising a bypass oil line  
15 for bypassing an oil line that has high pressure during  
forward movement in the oil-hydraulic closed circuit to  
reach an oil line that has low pressure during forward  
movement or an oil tank; a first opening/closing valve for  
opening or closing the bypass oil line; and an  
20 opening/closing valve controller that detects a load  
applied to the engine while traveling during working and  
opens the first opening/closing valve when the load  
exceeds a predetermined level.

25 2. A load controller according to Claim 1,  
wherein the opening/closing valve controller comprises a  
centrifugal governor that detects the number of  
revolutions of an output shaft of the engine or a  
revolution number detection shaft connected to the output  
30 shaft and opens the first opening/closing valve depending  
on the number of revolutions.

3. A load controller according to Claim 1,  
wherein the opening/closing valve controller is a torque  
35 sensing governor that detects load torque that affects an

output shaft of the engine, and opens the first opening/closing valve depending on the detected load torque.

5                   4. A load controller according to Claim 1, wherein a second opening/closing valve is provided on the valve-outlet side of the first opening/closing valve that opens or closes the bypass oil line by external operation.

10                   5. A load controller according to Claim 4, wherein the work vehicle comprises a clutch for an implement that supplies and halts transmission of power from the engine to the implement system, a clutch lever for an implement for operating the clutch for the  
15 implement, and a clutch interlocking system for an implement that connects the clutch lever for the implement to the second opening/closing valve; and

the clutch interlocking system for implement is structured so as to open the second opening/closing valve  
20 when the clutch lever for the implement is in the ON position and close the second opening/closing valve when the clutch lever for the implement is in the OFF position.

6. A load controller according to Claim 5,  
25 wherein an intermediate switching mechanism that can open or close the second opening/closing valve when the clutch lever for the implement is in the ON position is provided in a clutch interlocking system for the implement.

30                   7. A load controller according to Claim 4, wherein the work vehicle comprises a speed change gear in the traveling system for switching the traveling speed between a working speed and a non-working speed; a gearshift for controlling the speed change gear; and  
35 gearshift interlocking system for connecting the gearshift

and the second opening/closing valve;

the gearshift interlocking system being so structured so as to open the second opening/closing valve when the gearshift is at a working speed position, and to  
5 close the second opening/closing valve when the gearshift is at a non-working speed position.

8. A load controller according to Claim 7, wherein an intermediate switching mechanism that can open  
10 or close the second opening/closing valve when the speed change gear is at a working speed position is provided in the gearshift interlocking system.

9. A load controller according to Claim 4,  
15 wherein either the oil-hydraulic pump or the oil-hydraulic motor has an adjustable swash plate, an adjustable swash plate control lever for adjusting the inclination angle of the adjustable swash plate, and an adjustable swash plate interlocking system for connecting the adjustable swash  
20 plate control lever to the second opening/closing valve;

the adjustable swash plate interlocking system opening the second opening/closing valve when the adjustable swash plate control lever is at a working speed position and closing the second opening/closing valve when  
25 the adjustable swash plate control lever is at a non-working speed position.

10. A load controller according to Claim 9, wherein an intermediate switching mechanism that can open  
30 or close the second opening/closing valve when the adjustable swash plate control lever is at a working speed position is provided in the adjustable swash plate interlocking system.

35 11. A load controller according to Claim 4,

wherein a flow control valve is provided between the first opening/closing valve and the second opening/closing valve.

12. A load controller according to Claim 1,  
5 wherein a check valve with a set-pressure adjuster is provided in the valve-outlet side of the first opening/closing valve; the check valve with a set-pressure adjuster allowing only a one-way flow of a working oil from the valve-outlet side of the first opening/closing  
10 valve in the bypass oil line and having the ability to stop the one-way flow by external operation.

13. A load controller according to Claim 12,  
15 wherein the check valve with a set-pressure adjuster comprises a valve body, spring, and movable spring receiver,

the work vehicle comprising a clutch for the implement to supply and halt power transmission from the engine to the implement system, a clutch lever for the  
20 implement that controls the clutch for the implement, and a clutch/check valve interlocking system that connects the clutch lever for the implement to the movable spring receiver,

the clutch/check valve interlocking system being  
25 structured so as to increase the set pressure of the spring by turning off the clutch lever for the implement and transferring the movable spring receiver toward the valve body, and to stop the one-way flow in the bypass oil line at the OFF position of the clutch for the implement,  
30 and

an intermediate switching mechanism being provided in the clutch interlocking system for the implement, the intermediate switching mechanism being able to control the set pressure of the check valve with a set-  
35 pressure adjuster when the clutch for the implement is at

the ON position.

14. A load controller according to Claim 12,  
wherein the check valve with a set-pressure adjuster  
5 comprises a valve body, spring, and movable spring  
receiver,

the work vehicle comprising a speed change gear  
in the traveling system that can switch the traveling  
speed between a working speed and a non-working speed; a  
10 gearshift for controlling the speed change gear; and a  
speed change gear/check valve interlocking system that  
connects the gearshift to the movable spring receiver,

the speed change gear/check valve interlocking  
system being structured so as to increase the set pressure  
15 of the spring by moving the movable spring receiver toward  
the valve body when the gearshift is in a traveling speed  
position and stopping the one-way flow; and

an intermediate switching mechanism provided in  
the speed change gear/check valve interlocking system, the  
20 intermediate switching mechanism being able to control the  
set pressure of the check valve with a set-pressure  
adjuster when the speed change gear is in a traveling  
speed position.

25 15. A load controller according to Claim 12,  
wherein the check valve with a set-pressure adjuster  
comprises a valve body, spring, and movable spring  
receiver;

the work vehicle comprising an adjustable swash  
30 plate control lever to provide the oil-hydraulic pump of  
the hydrostatic transmission with stepless speed variation,  
and an adjustable swash plate/check valve interlocking  
system that connects the adjustable swash plate control  
lever to the movable spring receiver,

35 the adjustable swash plate/check valve

interlocking system being structured so as to increase the set pressure of the spring by moving the movable spring receiver toward the valve body when the adjustable swash plate control lever is at a non-working speed position,  
5 and to stop the one-way flow; and

an intermediate switching mechanism provided in the adjustable swash plate/check valve interlocking system, the intermediate switching mechanism being able to control the set pressure of the check valve with a set-pressure  
10 adjuster when the adjustable swash plate control lever is in a working speed position.

16. A load controller according to Claim 2, wherein the centrifugal governor is disposed on a rotating  
15 axis that operates in collaboration with the oil-hydraulic pump of the hydrostatic transmission, and the centrifugal governor is provided in the hydrostatic transmission together with the load controller.

17. A load controller according to Claim 16, wherein the centrifugal governor is housed in a closed chamber adjacent to the load controller, lubricating oil is held in the closed chamber, and the centrifugal governor comprises a flyweight and is structured so that  
20 the surface of the lubricating oil comes into contact with the flyweight when the flyweight opens.

18. A load controller according to Claim 1, wherein a flow control valve that controls the rate of  
30 flow in the bypass oil line is provided in the valve-outlet side of the opening/closing valve.

19. A load controller according to Claim 18, wherein the opening/closing valve and the flow control  
35 valve are housed in a same valve casing.

20. A load controller according to Claim 1,  
wherein the opening/closing valve is a solenoid-operated  
valve and the opening/closing valve controller comprises a  
5 temperature sensor for detecting the temperature of  
exhaust gas from the engine, and a controller that opens  
the opening/closing valve depending on the exhaust gas  
temperature detected by the temperature sensor.

10 21. A load controller according to Claim 1,  
wherein the opening/closing valve is a solenoid-operated  
valve, and the opening/closing valve controller comprises  
a pressure sensor for detecting oil pressure in an oil  
line that has high pressure during forward movement, and a  
15 controller that opens the opening/closing valve depending  
on the oil pressure detected by the pressure sensor.